LISA NASH PHOTO

Mad for Molluscs

What do shellfish tell us about our environment... and how can I get some for supper?

BY CHRIS NASH

Shellfish – mussels, clams, oysters and others – aren't just good for chowder or bait. As filter feeders and as food for other creatures, shellfish are critical components of marine ecosystems that contribute to healthy waters, and they can help indicate when waters *aren't* healthy.

Shellfish filter tremendous amounts of water each day, and in doing so, help keep water clear and clean. The health of shellfish is directly related to the water quality of the local environment — because they filter great amounts of water, shellfish absorb contaminants from the water that accumulate in their flesh. This means if a clam is living in dirty water that has high levels of bacteria, that clam will also contain high levels of bacteria and be unsafe to eat. It's a simple equation: Healthy shellfish equal clean water.

Because of the close relationship between shellfish and water quality, the New Hampshire Department of Environmental Services Shellfish Program, the New Hampshire Estuaries Project and other partners are working to monitor shellfish in New Hampshire and make their restoration and maintenance a priority, as well as to open more harvesting areas and support education about these ecologically important species.

Declining Clams and Oysters

Although many kinds of shellfish are available for harvest, the populations of some species have fallen on hard times in recent years. Researchers estimated a harvestable softshell clam population in Hampton/Seabrook harbor of 25,000 bushels in 1997, but that number had fallen to 3,276 bushels in 2003, and has not recovered since. Scientists believe there are multiple reasons for the decline. Some feel the ups and downs are typical of a common predator-prey relationship: when clams are plentiful, there is greater harvesting pressure, and populations decline. Once it becomes hard to find clams, harvest pressure eases, and the clams eventually rebound. Other factors, such as disease and predation by green crabs, also appear to play a role.

Oyster populations have also significantly declined in recent years. Biologists estimated over 128,000 bushels of harvestable oysters in New Hampshire in 1993. Today, the annual harvest is about 6,700 bushels. Most researchers believe the major cause of this decline was the impact of two oyster diseases, MSX and Dermo. These diseases weaken oysters and either kill them outright or make them more susceptible to other hazards. Oyster fisheries in the Chesapeake Bay and other mid-Atlantic estuaries also have been severely damaged by these two diseases and have not recovered.

Is there any good news? Yes, there appear to be a good number of juvenile oysters in several New Hampshire beds as a result of a successful breeding season in 2002, and these oysters currently are at or close to harvestable size. Also, several oyster restoration projects sponsored by the N.H. Estuaries Project, the University of New Hampshire Jackson Estuarine Laboratory and other organizations are beginning to produce positive results.

On the Flats

Although clam and oyster populations themselves may be in decline, the number of areas open to harvest continues to increase, giving harvesters more areas to seek their limit. Since 2000, over 600 acres of estuarine waters have been reopened to harvesting.

Shellfish are an important food source to many other marine species – and to humans too. Seafood lovers know that "fresh is best," and hundreds of New Hampshire residents know the secret to getting the freshest shellfish around – dig 'em yourself! A modest amount of shellfish harvesting, done with care using traditional tools, does not have a significant impact on overall populations.

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Estuarine mudflats provide habitat for softshell clams. Clams can also be found in the muddy shorelines adjacent to tidal creeks. Harvesters should always verify that the area they intend to dig is open for harvesting.

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If you've never tried shellfishing before, here's a primer on what you might find in New Hampshire, plus locations and techniques for various popular species:

Softshell clams: Commonly known as "steamers," these clams are common in New Hampshire's tidal mudflats. They can grow to a size of five inches or more across, but two-to-three inch clams are typically sought for food. The clams burrow in the mud, extending their siphon to feed during high tide, and leaving their tell-tale "clam hole" when they retract their siphon at low tide. When disturbed, they often squirt water from their siphon. These clams do not completely close their shells, which are brittle and easily broken. They burrow into the mud anywhere from a few inches to 18 inches, and are dug with short-handled "clam forks." The most popular New Hampshire location for clamming is the Hampton/Seabrook estuary, although other areas such as Little Harbor, Great Bay and the Bellamy River also have softshell clams.

American oysters: Oysters typically grow in large "reefs" at or below the low-tide line. Their irregularly shaped shells tend to be cemented to rocks, pilings or other oysters. Live oysters tightly close their shells, which tend to have a concave shape on the bottom side. Oysters are typically harvested by boat with long-handled tongs, which are used to bring up a mass of oysters, rock, shell and mud from the reef. The larger, live oysters are then "culled" from the smaller oysters, shell and rock. Some oyster locations are harvestable without a boat – there, chest waders and "bullrakes" or short-handled tongs are commonly used. In New Hampshire, the Great Bay estuary is known as the prime location for oysters, with Adams Point in Durham and Nannie Island in Great Bay offering some of the largest oyster "beds" in the estuary.

Blue mussels: Blue mussels have a smooth, bluish-black shell and tend to live in rocky areas of estuaries and the ocean. They often grow in clumps, attaching themselves to rocks or to each other by means of their "beard," or byssal threads. They are typically harvested by hand at low tide, although some commercial fishermen operate blue mussel "farms" in the open ocean. The largest blue mussel populations available for recreational harvest are in the Hampton/Seabrook estuary; smaller populations can be found up and down the rocky Atlantic Coast and in Little Harbor.

Surf clams: Typically harvested for chowders, these large clams have a very hard shell and are primarily found in the open ocean. Surf clams can be picked from the beach following strong coastal storms. Wearing chest waders and using heavy-tined pitchforks or rakes, recreational diggers pursue surf clams on very low tides along the beaches of Hampton and Rye. Surf clams can be "raked" with a variety of long-handled tools such as garden spading forks, garden cultivators, or specialized bullrakes. Hampton Beach, North Beach and Jenness Beach are popular locations for harvesting surf clams.

Razor clams: Named for their long, streamlined shape, razor clams are sometimes found in the same mud and sandflats as softshell clams. Their clam hole tends to have more of a keyhole shape, as opposed to the round hole of a softshell clam. Harvesters need to be quick with their clam fork, because razor clams can burrow out of reach with surprising speed.

Monitoring for Safety

Clams, oysters and mussels eat by filtering out microscopic bits of food in the water. In this filter-feeding process, shellfish can pick up contaminants from the water, including disease-causing bacteria and viruses. Humans who then harvest and consume contaminated shellfish can contract a variety of illnesses. For this reason, the N.H. Department of Environmental Services examines the pollution risk to shellfish harvesting areas. Some areas show a high degree of pollution risk because of nearby pollution sources, or because of high bacteria levels observed through sampling programs. Shellfish harvesting is never allowed in these "closed" areas. Some areas may show pollution risk under certain types of weather conditions, or during certain times of the year; these "open"

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areas are still subject to temporary closures, which can last days, weeks, or even months, depending on the kinds of pollution sources in the area.

In some years, an ocean outbreak of Paralytic Shellfish Poisoning, or PSP, – commonly known as "red tide" – can make New Hampshire's shellfish off-limits to harvesters for long periods. PSP is caused by a "bloom" of toxic organisms, and can be dangerous or even deadly to humans who eat contaminated shellfish.

In addition to pollution or PSP-related shellfishing closures, N.H. Fish and Game implements restrictions for resource conservation purposes, which vary by species. The best way for harvesters to keep track of what areas are open is to consult the maps in the N.H. Fish and Game's *Saltwater Digest*, or on the Department of Environmental Services website at www.des.state.nh.us. If an area is shown as being open, harvesters should then consult the "Clam Flat Hotline" (1-800-43-CLAMS) to see if a temporary closure is in place for their area of interest.

Tools of the Trade

Shellfish harvesting does not require a large investment in equipment, though clam or oyster harvesters — N.H. residents only — must get a $30 permit from any license agent. Shellfish areas tend to be wet, muddy and sometimes slippery places, so rubber boots are a good idea. Hip or chest waders are ideal for keeping mud off your clothes (and the inside of your car!), crossing tidal creeks, and wading into knee-deep water to rinse your shellfish and equipment. Gloves to protect hands from sharp shells and abrasive sand and mud are also a good idea.

Harvesting mussels requires no equipment, as it is typically done by hand. But a clam fork is needed to dig for softshell or razor clams. Handles must be less than 18" long, and can be purchased from local marine equipment and fishing tackle stores.

You need some sort of basket to hold your catch. Some people buy a specialized metal clam basket, which allows water and mud to flow through and helps with the task of rinsing mud off the shellfish. If you plan to use a plain 5-gallon bucket, make a line with permanent marker at the 10-quart mark, to ensure you don't exceed the daily limit. Keep in mind that your license number must be clearly marked on the outside of the clam container and your license must be worn in plain view while harvesting.

Oyster tongs are long-handled, hinged implements that can be a little more challenging to find, but are necessary for accessing oysters in deeper water. Check the Internet for companies that manufacture them.

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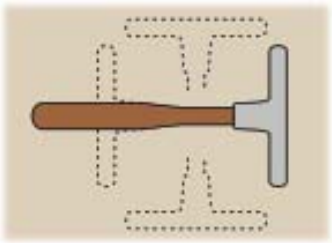
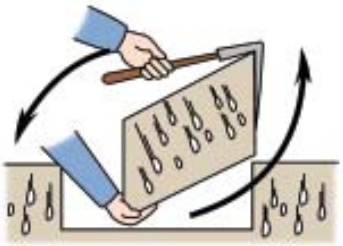
Diggin' It!

Proper clam digging is one way to help protect and improve New Hampshire clam stocks. Here's the best technique:

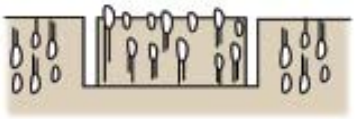


1. Select and cut a manageable section of flat on four sides.

2. Try to judge the location and depth of most clams of suitable size. Work fork into the flat with gentle rocking motion, adjusting angle of fork to move between and under the clam burrows.



3. Turn the piece of flat completely over and place it in the resulting furrow. (Placing the piece to one side may needlessly cover an undug area with small clams vulnerable to smothering.)



4. Pick out the exposed clams that are of suitable size.

5. With fork tines straight downward, gently break up the section of flat to expose the remaining clams.

6. When all harvestable clams have been taken from the piece, simply leave it as it lies in the furrow. This protects the remaining clams from predators such as crabs and gulls. Clams not harvested will gradually return to an upright feeding position.

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A clam fork is the best tool for turning over sections of mud flat to find softshell clams.

If harvesting surf clams, a raincoat over your chest waders helps prevent a thorough soaking from breaking waves. Hand rakes, spading forks and garden tools can be used to probe the sand and dig out the clams, but the back and forth water motion in the surf can make it difficult to get a surf clam into your basket. The built-in basket in a commercial bullrake helps solve this problem.

After the Harvest

Now that you've got your shellfish, what next? Here are a few suggestions on keeping your shellfish fresh and preventing possible health issues from improperly handled or stored shellfish:

- Clean your shellfish of external mud and debris by rinsing in water where you dug them. At home, rinse and scrub the shells under running water.
- KEEP THEM COLD! Transfer your shellfish to a clean cooler with ice or ice packs for the trip home, and refrigerate them right away when you get home.
- Some people like to soak their softshell clams to get them to purge themselves of dirt and grit inside the shell. If you use local seawater for this purpose, collect it in a clean container, and only take water from areas that are approved for harvesting (you don't want to soak your clams in polluted water!)
- Store shellfish in an open plastic or glass container, cover with a clean wet towel, and store in a dry, cool place – a refrigerator temperature between 32 and 42 degrees is ideal. Never store shellfish in an airtight container. If using ice, keep the shellfish separate from the melt water.
- Some people store their live shellfish for later use by hanging them underwater in mesh bags from their shoreline dock or boat. This can be hazardous, especially if the surrounding water is prone to pollution, such as waters that are closed to shellfish harvesting. Proper refrigeration and quick consumption within a day or two of harvest is the best way to ensure high quality and avoid health issues.
- All types of food, including shellfish harvested from approved waters, can carry health risks. Shellfish harvested from approved waters and handled/stored properly carry minimal health risks if consumed raw by healthy individuals. According to the New Hampshire Bureau of Risk Assessment, people with certain medical conditions — such as liver disease, reduced stomach acidity or a weakened immune system — may be particularly susceptible to serious illnesses, and should avoid eating raw or partially cooked shellfish.
- Discard dead shellfish. Most shellfish keep their shells closed when alive (note that softshell, or steamer clams, cannot completely close their shells). Discard shellfish with gaping/open shells, as well as those that are broken, damaged or have a foul odor and/or dried meat.
- When cooking shellfish, avoid cross-contamination of raw with cooked shellfish. Keep utensils, work surfaces and cooking areas clean.
- Raw shellfish can be frozen for later use, but the thawed meats are softer and typically used only for cooking. To freeze shellfish, clean thoroughly and freeze either in the shell or shucked. Quick freezing minimizes tissue damage. Shellfish should be stored in their own "liquor," or water. Remove excess air to avoid freezer burn. Frozen shellfish should be thawed in the refrigerator for 24 hours, and should not be refrozen.

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Whether you're looking for dinner or just a nice day "digging" the New Hampshire seacoast, there's nothing like a muddy sunrise seeking shellfish on the flats to appreciate the important ecological role they play in our estuarine environment. WJ

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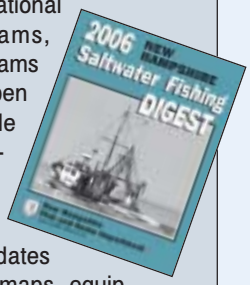
Portions of this article originally appeared in the New Hampshire Estuaries Project "Shellfish Spotlight."

When Can I Go Clamming?

New Hampshire's softshell clamming season opens September 9, 2006 (the first Saturday after Labor Day) and runs through the end of May. Clamming is on Saturdays only, and not all areas are open throughout the season – for example, Hampton/Seabrook or Little Harbor often have poor water quality in early fall and are generally not open to shellfish harvesting until later. Similarly, some areas may be closed for the summer before the end of May. A clam license (available only to New Hampshire residents) is required for softshell clamming.



No license is needed for recreational harvest by hand of surf clams, mahogany quahogs and razor clams on the sections of Atlantic coast open for harvest; pending acceptable water quality conditions, this season is open year-round and not limited to Saturdays.

Call 1-800-43-CLAMS for updates on closures. For harvest limits, maps, equipment regulations and other details, consult the *N.H. Saltwater Fishing Digest* at **www.nhfg.net** or the N.H. Shellfish Program page at **http://des.nh.gov/wmb/shellfish**.

One fringe benefit for the early-morning shellfish harvester is seeing sunrise on the flats, like this one at Berry Brook.

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